United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Mother Lode Field Office
5152 Hillsdale Circle
El Dorado Hills, CA 95762

www.ca.blm.gov/motherlode

Integrated Weed Management at the Cosumnes River Preserve (CA-180-11-39) Finding of No Significant Impact September 2011

It is my determination that this decision will not result in significant impacts to the quality of the human environment. Anticipated impacts are within the range of impacts addressed by the Sierra Resource Management Plan and Cosumnes River Preserve Management Plan. Thus, the project does not constitute a major federal action having a significant effect on the human environment; therefore, an environmental impact statement (EIS) is not necessary and will not be prepared. This conclusion is based on my consideration of CEQ"s following criteria for significance (40 CFR §1508.27), regarding the context and intensity of the impacts described in the EA and based on my understanding of the project:

1) Impacts can be both beneficial and adverse and a significant effect may exist regardless of the perceived balance of effects. Potential impacts include noxious vegetation removal, soil disturbance and temporary noise and dust due to integrated weed management activities, and enhanced quality of wetland, riparian and floodplain habitat. However, none of these impacts would be significant at the local scale or cumulatively because of the weed management actions and specific project design features. Visual resources at the Preserve would be positively affected by the weed management techniques outlined in the EA by reducing noxious weeds that hinder scenic access and by restoring native habitats.

2) The degree of the impact on public health or safety. No aspects of the project have been identified as having the potential to significantly and adversely impact public health or safety due to specific project design features and the nature of the herbicide. In fact, the integrated weed management approach to control of noxious vegetation contributes to the wealth and health of the public in general by protecting or enhancing natural resources and by providing high quality visual landscapes on the Preserve"s public use areas.

3) Unique characteristics of the geographic area. The project area is within the boundaries of Cosumnes River Preserve. The California Natural Diversity Data Base (CNDDB) has identified two special status plant communities along the Cosumnes River riparian zone. Great Valley Oak Riparian Forest and Great Valley Mixed Riparian Forest. In addition the USDA has identified some of the Preserve soils as prime or unique

farmland. However, the project will not significantly and adversely affect these special plant communities or prime or unique soils. In fact, the project will serve to protect and enhance these resources.

4) The degree to which the effects on the quality of the human environment are likely to be highly controversial effects. No anticipated effects have been identified that are scientifically controversial. As a factor for determining within the meaning of 40 C.F.R. § 1508.27(b)(4) whether or not to prepare a detailed environmental impact statement, "controversy" is not equated with "the existence of opposition to a use." *Northwest Environmental Defense Center v. Bonneville Power Administration*, 117 F.3d 1520, 1536 (9th Cir. 1997). "The term „highly controversial" refers to instances in which „a substantial dispute exists as to the size, nature, or effect of the major federal action rather than the mere existence of opposition to a use." " *Hells Canyon Preservation Council v. Jacoby*, 9 F.Supp.2d 1216, 1242 (D. Or. 1998).

5) The degree to which the possible effects on the human environment are likely to be highly uncertain or involve unique or unknown risks. The analysis does not show that this action would involve any unique or unknown risks.

6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration. Integrated weed management at the Preserve for management, restoration efforts, education, research, recreation, and facilities maintenance or improvement is not precedent setting.

7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. No significant site specific or cumulative impacts have been identified. The project is consistent with the actions and impacts anticipated in the Sierra RMP.

8) The degree to which the action may adversely affect National Historic Register listed or eligible to be listed sites or may cause loss or destruction of significant scientific, cultural or historical resources. The action is not expected to adversely affect properties listed on or eligible for the National Register of Historic Places.

9) The degree to which the action may adversely affect ESA listed species or critical habitat.

Although listed species do occur or have the potential to occur on the Preserve, due to project design features and compliance with NEPA requirements at the site specific level, no adverse affects to listed species or their habitats are expected.

10) Whether the action threatens a violation of environmental protection law or requirements. There is no indication that this decision will result in actions that will threaten such a violation.

_____ _____

William S. Haigh Date
Field Manager, Mother Lode Field Office

United States Department of the Interior

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Mother Lode Field Office
5152 Hillsdale Circle
El Dorado Hills, CA 95762
www.blm.gov/ca/folsom

EA Number: CA-180-11-39

Proposed Action: CONTINUED IMPLEMENTATION OF AN INTEGRATED WEED MANAGEMENT PROGRAM AT THE COSUMNES RIVER PRESERVE – JANUARY 1, 2012 TO JANUARY 1, 2015

Location: Southern Sacramento County within portions of six townships: T5N, R4E; T5N, R5E; T5N, R6E; T6N, R4E; T6N, R5E; and T6N, R6E (Most section lines in these townships have not been surveyed. Of the approximately 138,000 acres within these townships, 14,756 acres are lands owned by Preserve partners and included in this EA.)

1.0 Purpose of and Need for Action

1.1 Need for Action

The U.S. Bureau of Land Management (BLM) proposes to continue to implement an integrated weed management (IWM) program at the Cosumnes River Preserve (Preserve). The Preserve is a 46,000-acre nature preserve whose mission is the protection and enhancement of California's native biodiversity along the Cosumnes River. The BLM is one of seven land-owning partners at the Preserve. The BLM serves as the lead Federal agency at the Preserve through a BLM-funded Preserve Manager's position. The BLM's Preserve Manager is responsible for overseeing all Preserve partner's activities as they relate to fish, wildlife, plants and other natural resources values at the Preserve. The other Preserve partners are either non-governmental organizations or state and local government agencies that do not have federal requirements per se, but may need to produce environmental studies that meet federal or state requirements in order to use federal funding, receive required federal permits, or use federal lands and other resources. Of note, approximately 1,789 acres potentially affected by the proposed action analyzed in this Environmental Assessment (EA) are owned by the BLM at the Preserve. Analysis of actions carried out on non-federally owned Preserve partner's properties are addressed in the Cumulative Impacts section of this document.

Currently, several invasive, non-native plant species (collectively referred to as "weeds" or "weed species" throughout this document) including perennial pepperweed (*Lepidium latifolium*), yellow star thistle (*Centaurea solstitialis*), poison hemlock (*Conium maculatum*), bristly ox-tongue (*Picris echioides*), water primrose (*Ludwigia hexapetala*), Himalayan blackberry (*Rubus armeniacus*) and others are becoming increasingly common at the Preserve. These weed species are extremely problematic because they spread quickly and displace native plants. This in turn negatively affects fish, wildlife, and other local fauna that rely upon native plants for their existence. The result is an overall loss of native biodiversity.

The proposed IWM Program includes the continued use of mowing, disking, grazing, prescribed burning, biological control agents, hand removal, and selected herbicide treatments to control weed species over the next three years (January 1, 2012 to December 31, 2015). All of the proposed methods of controlling weed species have been implemented at the Preserve at one time or another since its inception in 1987. However, no single method has proven to be effective by itself so an IWM strategy that incorporates the use of all methods is imperative. The proposed action would help to maintain healthy functioning ecosystems at the Preserve; aid in the restoration of native plant communities that have been degraded or displaced by weed species; maintain established weed infestations at or below current levels; eradicate new colonies of weed species before they become permanently established at the Preserve; help reduce the risk of catastrophic wildfire by eliminating or reducing fuel loads created by excessive build-ups of non-native plant residues; and reduce the risk of spread and invasion of weed species to other areas of the Preserve and to neighboring private lands.

1.2 Conformance with Applicable Land Use Plans and Other Guiding Documents

Per the Federal Land Policy and Management Act of 1976 and the Federal Noxious Weed Act of 1974, the BLM is required to manage noxious weeds on public lands. The proposed action is in conformance with several plans and guiding documents. The BLM's February 2008 Sierra Resource Management Plan (RMP) is the overarching Plan for management actions in the entire Mother Lode Field Office's jurisdiction. The RMP states that one goal for vegetative communities in the Mother Lode Field Office-managed area is to "*Promote a healthy and diverse mix of plant communities and provide a wide spectrum of organisms and ecosystem processes for the needs of plants, animals and humans.*" (USDI, Bureau of Land Management 2008) The Objectives stated under that goal include:

1) "*Conserve and restore oak woodland, conifer forest, chaparral, riparian, meadow, Central Valley wetland, and grassland habitats to support long-term viability of native bird species, sensitive species, and the associated natural diversity of these habitats.*"

2) "*Manage vegetation (including invasive species removal) to improve habitat conditions for particular wildlife species.*"

3) "*Control invasive species and increase native plant species using early detection, rapid response, and prevention measures.*" And

4) "*Reduce hazardous fuels to prevent catastrophic wildfire.*"

Three of the management actions for promoting vegetative communities are to:

1) "*Improve habitat conditions for special status species through vegetation treatment in Central Valley wetlands, oak woodlands, coniferous forests, grasslands, riparian forest, and riverine habitats."*

2) "*Prevent, eliminate, and/or control undesired non-native vegetation or other invasive species using an Integrated Pest Management approach that combines biological, cultural, physical, and chemical tools to minimize economic, health, and environmental risks.*"

3) "*Use prescribed fire, mechanical mastication, herbicides, manual removal, seeding, propagation, and planting or a combination of these methods to promote healthy, diverse vegetation communities.*"

Another goal stated in the RMP for fish and wildlife is to:

1) "*Maintain, improve, or enhance native fish and wildlife populations and ecosystems upon which they depend.*"

One Objective stated under that goal includes:

1) "*Maintain or improve desired native plant communities while providing for wildlife/fisheries needs and soil stability.*"

The proposed goals, objectives and actions for the Preserve's managed wetlands program are stated in the Preserve's March 2008 Final Management Plan (Kleinschmidt 2008). Sub-goal four in the Natural Resources Stewardship chapter states: *"**Maintain and restore a mosaic of freshwater wetland habitats (seasonal and permanent) that support native species.**"* Some of the objectives of sub-goal four include:

1) "*Maintain a minimum of 1,000 acres of seasonal managed ponds and evaluate the need for more managed wetlands ponds on a case-by-case basis*;"

2) "*Restore mosaic of tidal freshwater wetlands and associated habitats on tidal sloughs;*"

3) "*Restore and/or create freshwater wetlands to support waterfowl, cranes, and other wetland species;*"

4) "*Ensure that habitat requirements of special status species are incorporated into wetland restoration and management plans as appropriate;*"

5) "*Minimize the impact of non-native invasive species in wetlands through early detection and control efforts;*" and

6) "*Maintain and enhance water quality*."

The proposed action is in conformance with the RMP and tiers off its Final Environmental Impact Statement (FEIS), Alternative D, the Preferred Alternative, which balances environmental protection with public use.

This EA also tiers to *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States - Final Programmatic Environmental Impact Statement* (2007)(PEIS). http://www.blm.gov/wo/st/en/prog/more/veg_eis.html. The guidelines and methods approved for vegetation management, and the relevant environmental analyses, in the PEIS are incorporated by reference into this document.

2.0 Proposed Action and Alternatives

2.1 Proposed Action

The proposed action is to implement an IWM Program at the Preserve. The proposed IWM Program includes the continued use of mowing, disking, grazing, prescribed burning, biological control agents, hand removal, and selected herbicide treatments to control weed species beginning January 1, 2012 and continuing through December 31, 2015. Individual and/or combinations of the proposed methods would be implemented as necessary at the appropriate time of year and location to control or eliminate weeds. Herbicides would generally be used as a secondary treatment in support of non-chemical treatment methods. At certain times of the year (*e.g.,* early rosette stage), or in specific areas or under specific circumstances, herbicidal treatments may be used as a primary method when it is determined that other control methods would be ineffective to achieve the desired results.

2.1.1 Mechanical Treatments

Mechanical treatments such as mowing and discing would be used as a primary control method to control weeds. Annual weed species such as poison hemlock, wild mustard (*Brassica spp. and Sinapis spp.*), wild radish (*Raphanus spp.*), annual grasses and other species would be mowed during the budding or flowering stage of plant development to reduce or eliminate viable seed production and to reduce competition with native plants for resources such as sunlight, water, and soil nutrients. This control method has been used successfully to help native plant species survive infestations of weed species. Mowing would also be used as a method to pre-treat biennial and perennial weed species such as perennial pepperweed, yellow star thistle, and fennel (*Foeniculum vulgare*). The advantage of mowing perennial weed species at the flowering or budding stage is that the plants have used much of the stored energy in their root systems. Mowing makes the plant more susceptible to follow-up herbicidal treatments using the lowest concentrations of product to achieve the greatest amount of success. In the case of perennial pepperweed, Young *et al.* (1995) and others, for example, have found that perennial pepperweed cannot be controlled through mechanical methods alone without follow-up application(s) of herbicides.

Mowing alone is commonly used in swales within managed wetland ponds to remove excessive buildups of vegetation such as common cattail (*Typha latifolia*) and bulrush (*Scirpus spp*.). It is also used to open dense growths of vegetation and create habitat diversity that waterfowl prefer and in upland areas to pre-treat species like perennial pepperweed before herbicidal treatments can occur.

Discing would usually entail turning the soil over a depth of 4-10 inches in order to maintain the optimal conditions for succession of moist soil plants such as swamp timothy (aka swamp grass) (*Crypsis schoenoides*), pricklegrass (*Crypsis vaginiflora*), sprangletop (*Leptochloa fasicularis*), watergrass (aka barnyard grass) (*Echinochloa crus-galli*), and water smartweed (*Polygonum spp.*) in wetland ponds. Disking would also be used to reduce dense stands of cattails, bulrush, and other species that become too dominating in ponds; this is especially effective when followed by two to three months of exposure to the sun to thoroughly dry and kill the plants. Discing in upland areas would generally be used to prepare a native grass and forb restoration site. It is rarely used to control weed species except for in an agricultural field.

Generally, within the Preserve's managed wetland units, approximately 100 acres are mowed annually along with approximately 100 acres being disked or otherwise "disturbed" annually using regular farming equipment. Within the upland areas, approximately 50-100 acres per year would be treated by mowing. However, if treatment is required on a larger scale due to infestations that need immediate intervention, the annual acreage may be increased to as much as 300 or more acres throughout the Preserve.

2.1.2 Cultural Treatment

Cultural treatments such as grazing would continue to be used to reduce invasive grass dominance, fuel loads, vegetation height, and weed seed production. Grazing would also continue to be used as one aspect of integrated weed control where appropriate. Typically grasslands would be grazed by cattle on 129 acres of BLM-owned property and on approximately 4,000 acres of non-federal Preserve properties from fall through spring to remove vegetative buildup and reduce annual weed seed production. Goats and/or sheep would be grazed in forested areas, restoration sites, and overgrown fallow fields to reduce excess vegetation, reduce annual weed seed production, and to control the growth of woody or noxious species throughout the year as needed and as appropriate. Typically less than 200 acres would require grazing treatments by goats and/or sheep annually but, depending on a given year's infestation and weed production, and the availability of sheep or goats, the acreages needing grazing could be as high as 500 acres annually.

2.1.3 Physical Treatments

Physical treatments including flooding, prescribed fire, and hand pulling would be used alone or in conjunction with other treatments where appropriate to control invasive weed species. Where applicable in wetland ponds or other areas with water control infrastructure, weed species would be flooded to a depth that would cover most or the entire plant and the water level would be maintained for a period of approximately 10 to 17 days dependent on water temperature, weather and soil conditions. Typically flooding would occur when susceptible weeds are in the seedling, basal rosette, or early growth stage of development. Approximately 50-100 acres would be treated by flooding annually.

Prescribed fire would be used to control undesirable weed species, typically when seed heads begin to appear, the plants begin to dry out, and prior to seed shatter *i.e.* when seed heads break and fall to the

ground. At certain times and in certain areas (*e.g.,* riparian forests), prescribed fire may be used in the winter, cool season. Prescribed fire would also be used as a primary control method or as a pre-treatment method to remove rank overgrowth or residual dry vegetation in preparation for additional treatments. Approximately 50-500 acres could require prescribed fire as a weed control method annually.

Hand pulling would be used on weeds in sensitive areas such as cultural sites and special status species habitat where other methods of control are not allowed or feasible. It would also be used on a small scale to control small, isolated patches of weeds where equipment is impractical, with the exception of invasive species such as perennial pepperweed that cannot be controlled by hand pulling. Typically, hand pulling efforts would occur during the early developmental stages of plant growth prior to plants setting seed. However, in the case of highly invasive weeds that have set seed such as milk thistle (*Silybum marianum*), the seed heads would be removed and placed in plastic trash bags for disposal prior to the plant being hand pulled. Annually, no more than about 10 acres would be treated using hand pulling techniques.

2.1.4 Biological Control Agents

Biological control agents such as bud weevils (*Bangasternus orientalis*), hairy weevils (*Eustenopus villosus*), peacock flies (*Chaetorellia australis*), false peacock flies (*Chaetorellia succinea*), and/or yellow star thistle rust (*Puccinea jaceae* var. *solstitialis*) would be released to control large infestations of yellow star thistle. Protocols for releasing biological agents would be strictly adhered to and only after acquiring all necessary permits. Other biological agents that are approved for release for the control of noxious weeds would be considered on a case-by-case basis as needed. As other biological agents become available for use on non-native invasive species, Supplemental Environmental Analysis would be prepared as needed that would tier to this document.

2.1.5 Herbicides

Select herbicides would be used as a secondary treatment to increase the effectiveness of the primary treatment techniques. Nine herbicides are proposed for use:

Chlorsulfuron
Clopyralid
Dicamba
Glyphosate
Diquat
Imazapyr
Triclopyr
2,4-D
Aminopyralid (pending BLM approval)

These products will be applied at the manufacturer's suggested application rates using approved methods as specified on the product labels and summarized in the pesticide use proposals (PUPs). All relevant BLM standard operating procedures (SOPs) for herbicide treatments outlined in the PEIS identified in Appendix B of the Record of Decision (ROD) and all other BLM guidance documents will be implemented. The combined total of all treatments of any one product on a given site will not exceed the maximum use rate per year as recommended by manufacturer label. All standard and required safety measures will be implemented prior to, during, and after application of all herbicides.

Chlorsulfuron is a selective systemic herbicide that may be applied by hand held equipment usually April through September for annual and perennial broadleaf weed control. The target species is perennial pepperweed and other broadleaf plants in native grass plantings. Less than 50 acres per year would be treated with chlorsulfuron products.

Clopyralid is a selective herbicide that may be applied using hand held equipment or ground vehicle usually January through June. It will be primarily used to control thistle species. Clopyralid may be used along with other products to control broadleaf plants on native grass plantings. Less than 100 acres per year would be treated with clopyralid products.

Dicamba is a selective pre and post-emergent systemic herbicide that would be applied by hand held equipment, ground vehicle, or as a cut stump treatment usually February through December primarily to control woody broadleaf species and exotic tree species. An average of less than 50 acres per year would be treated with dicamba products. Because dicamba is highly mobile in soils dicamba will only be applied to upland areas to avoid risk of migration into aquatic systems.

Diquat is a non-selective post-emergent contact herbicide that would be applied by hand held equipment, ground vehicle, or airborne vehicle usually February through October primarily to control a broad spectrum of terrestrial and aquatic weeds. Aquatic weeds may include species such as parrotfeather (*Myriophyllum aquaticum*), Eurasian watermilfoil (*Myriophyllum spicatum*), water hyacinth (*Eichhornia crassipes*), hydrilla (*Hydrilla verticillata*), Brazilian egeria (*Egeria densa*), and common elodea (*Elodea canadensis*). An average of less than 50 acres per year would be treated with diquat products.

Glyphosate is a non-selective, systemic herbicide that may be applied year round by hand held equipment, ground vehicle, or airborne vehicle. It would usually be used January through November as the primary chemical to control non-native grasses and broadleaf plants. Only glyphosate products that are approved for use in aquatic environments would be used to control water primrose or other aquatic weeds. Less than 250 acres per year would be treated with glyphosate products.

Imazapyr is a non-selective pre and post-emergent herbicide that would be applied by hand held equipment, ground vehicle or airborne vehicle usually January through October to control a broad spectrum of aquatic and terrestrial weed species. Imazapyr may also be applied directly as a cut stump, basal bark, or girdle treatment on exotic tree species. An average of less than 100 acres per year would be treated with imazapyr products.

Triclopyr is a selective systemic herbicide that may be applied February through December undiluted as a cut stump, basal bark, or girdle treatment on exotic tree species. Triclopyr may be applied by handheld equipment, ground vehicle, or by airborne vehicle to control Himalaya blackberry (*Rubus armeniacus*) and other broadleaf plants. Aquatic formulations of triclopyr would be used to control broadleaf plants such as water primrose and water hyacinth in aquatic environments. Less than 100 acres per year would be treated with triclopyr products.

2, 4-D is a selective broadleaf herbicide that would be applied by hand held equipment, ground vehicle, or airborne vehicle usually January through October primarily to control non-native, invasive broadleaf species such as bristly ox tongue and poison hemlock but may also be used to control floating aquatic weeds such as water hyacinth. An average of less than 50 acres per year would be treated with 2, 4-D products. Because 2, 4-D is slightly to moderately toxic to birds and toxic to some aquatic organisms, 2, 4-D will only be used when other herbicides are not effective.

Aminopyralid is a selective systemic broadleaf herbicide that would be applied by handheld equipment, ground vehicle or airborne vehicle usually January through June primarily to control thistles and other broadleaf invasive weeds on native grassland restoration sites. Pending approval for use on BLM-owned properties, aminopyralid would be applied to an average of less than 100 acres per year.

2.2 Project Design Features

All mitigation measures for chlorsulfuron, clopyralid, dicamba, diquat, glyphosate, imazapyr, triclopyr, and 2,4-D outlined in the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Final EIS* (BLM 2007) will be implemented.

Herbicides will be applied at the lowest effective rate, per the manufacturer's label.

Herbicide treatments will be used in conjunction with restoration, when practical, to reduce the likelihood of weed expansion or colonization. For example, native grasses may be planted after an area is treated with herbicides for star thistle.

Depending on a site-specific analysis, all new invasive species may be chemically treated. Populations or sites of less than 25 plants will first be controlled via mechanical methods, as previously described, and will only be chemically treated as a last resort, with the exception of new invading perennial pepperweed and Himalaya blackberry sites where mechanical methods are not effective.

Herbicides will be applied directly to target weeds using hand held equipment, wick applications, cut stem, or by basal bark treatment on all except the largest sites where ground vehicle boom sprayers or aerial application may be used.

Where weeds compete with desired native grasses, chlorsulfuron, clopyralid, triclopyr and 2,4-D may be used because these herbicides only affect broadleaf plants.

Herbicide application will not occur when: 1) sustained wind speed exceeds five miles per hour; 2) recommended maximum air temperatures are exceeded; or 3) when precipitation is expected within 24 hours.

Managed wetland areas that require treatment using herbicides not approved for aquatic use will be dewatered two weeks prior to application and remain dewatered for 45 days following application unless the manufacturer's recommendations specify otherwise.

Hand held equipment will be used when applying chlorsulfuron, dicamba, or ester formulations of triclopyr on sites within 50 feet of streams, open water, wetlands or ditches with standing water. Sites with soils exhibiting very rapid infiltration and excessive drainage will not be treated with herbicides that have a high potential for movement.

To reduce the impacts of off-site drift to typical non-target terrestrial plant species, a 900 foot buffer zone will be established to protect riparian vegetation in salmonid habitat when applying chlorsulfuron.

Glyphosate and salt formulations of triclopyr may be used in riparian and wetland areas if site conditions (slope, soil characteristics, etc.) indicate that the risk of off-site movement is low. Hand held equipment, basal bark or cut-stump applications will be used as necessary in riparian and wetland areas to eliminate chances for soil and water contamination.

Generally herbicide applications will be coupled with manual control methods. For example, star thistle will be mowed prior to the flowering stage and the site may be sprayed if a significant number of plants continue to persist. Additionally, if it is not possible to time manual control methods when they would be most effective (*e.g.,* rainy season when equipment cannot be used), chemical applications may be used in place of the manual control methods at some locations.

Documentation must clearly demonstrate that manual treatments in combination with herbicide applications are achieving a high degree of effectiveness in reducing weed densities over the three-year implementation period (as demonstrated by our photo monitoring data and written observations).

All populations of special status plant species within a treatment site will be identified and avoided during treatment operations.

Herbicide applications in areas where threatened, endangered, or sensitive wildlife species are known to exist will be in compliance with all applicable biological opinions issued by the U.S. Fish and Wildlife Service and/or California Department of Fish and Game.

The public will be notified via signs when treatments are proposed for public areas of the Preserve. Signing will be in accordance with BLM policy and the manufacturer's instructions on the product label.

Herbicide transport, mixing and use will be governed by the following standard operating procedures and/or more current standards as they are updated:

1. Carry only enough herbicide daily to cover proposed treatment sites for that day;

2. Mix only the amount of solution needed to complete daily treatments;

3. Herbicide containers must be secured and prevented from tipping during transport;

4. Emergency spill equipment must be on hand to adequately deal with the amount of herbicide concentrate being transported;

5. Spill plans and protocols are handled by a certified pesticide applicator on staff and will be developed before any proposed treatment is carried out. This information will be available in every treatment vehicle and to all staff that are assisting in herbicide applications;

6. All staff and volunteer safety equipment and regulations will be used and followed as per the manufacturer's labeled directions, Material Safety Data Sheets, BLM guidelines, and all other applicable guidelines and regulations;

7. Materials Safety Data Sheets covering each herbicide will be available in the Preserve's MSDS binders located at the Visitor center, Farm Center, and Barn. Copies of the applicable MSDS's will be made available for transport in every treatment vehicle; and

8. All herbicide treatments will be properly documented by the certified pesticide applicator and all required documentation will be submitted to the appropriate agencies.

BLM-approved biological agents will only be released after acquiring the appropriate release permits.

Standard protocols for the release of biological agents will be strictly adhered to before, during and following release.

All mechanical treatments such as mowing and discing will be timed to occur at the most effective stage of plant development or in conjunction with secondary treatments.

Mechanical and physical treatments, other than hand pulling, that are carried out in managed wetlands that are considered potential giant garter snake habitat will be dewatered for a minimum of two weeks prior to treatment activities and will take place between May 1st and October 1st during the snake's active season.

A prescribed fire plan will be developed in strict accordance with BLM policy and all necessary permits will be acquired in accordance with local and State law prior to all prescribed burns.

2.3 No Action

An IWM Program would not continue to be implemented to control weed species at the Preserve. Current habitat management strategies such as artificially flooding managed wetlands to control terrestrial weeds, mowing to reduce seed production, and manual removal by hand pulling or shovel would continue to be implemented at their current rate and methods as time and staffing allow.

2.4 Alternatives Considered but Eliminated from Detailed Analysis

A) No treatment of weed-dominated areas at the Preserve. Under this alternative there would be no treatment of invasive non-native plants. Control methods would not be used to control weed species at the Preserve. This alternative would allow invasive, non-native plants to persist where infestations currently occur and allow new infestations to become established. The primary method of control would be natural processes such as seasonal flooding. This alternative would not meet the purpose and need of protecting native biodiversity and habitat at the preserve and it would fail to achieve the overall mission of the BLM.

B) Use only cultural and biological control methods. Under this alternative only cultural and biological methods such as livestock grazing or release of non-native insects or pathogens to control weeds would be used (*e.g., Eustenopus villosus* weevils to control star thistle). Disadvantages to this approach include high initial costs, a prohibitive permitting process (BLM probably could not get a permit to use biological control methods for certain situations), uncertainty of effectiveness, and the potential for indirect ecological effects. In many cases grazing treatments alone on areas with perennial pepperweed infestations, for example, may accelerate the rate of spread by removing desired plants that compete with perennial pepperweed. Plants such as pepperweed that benefit by disturbance or spread by rhizome and/or vegetative propagation would continue to spread and displace native and

desirable plant species. This alternative was eliminated because these control methods alone would not be effective, they may have indirect ecological effects, would not control the spread of most invasive species, and could adversely impact land health.

C) Use herbicides only to control weeds at the Preserve. Under this alternative only herbicide applications would be used to control weeds. Disadvantages to this approach include increased cost, increased levels of chemicals in the environment, the potential for weedy species becoming resistant to chemical treatments, and decreased efficacy on plant species that require a combination of treatments (*e.g.* woody species that required cut stump treatments or the mowing of perennial species to increase efficacy of herbicide treatments). This alternative was eliminated because chemical control methods alone would not be completely effective, they may have indirect ecological effects, be financially infeasible, and/or could not be implemented on all areas.

D) Use only mechanical and physical control methods. Under this alternative only mechanical and physical control methods such as mowing, discing, flooding, prescribed fire, and hand pulling would be used to control weeds. Disadvantages to this alternative include ineffectiveness on perennial species that cannot be controlled by mechanical or physical means alone, increased impacts to air quality from dust or smoke, and increased soil disturbance which may promote growth of some weedy species that flourish in disturbed conditions. In addition, hand pulling is impractical on larger scale infestations. This alternative was eliminated because mechanical and physical control methods alone would not be completely effective, may have indirect environmental effects such as increased runoff, would not control the spread of some invasive species, and could not be implemented on all areas in an efficient manner.

3.0 Affected Environment

Soils

Preserve lands host a variety of soil types ranging from clay hardpan to sandy loam. The San Joaquin, Columbia-Cosumnes, Egbert-Valpac, Dierssen, and Sailboat-Scribner-Cosumnes soil series are in the project area. The primary soil types are the Columbia-Cosumnes and San Joaquin soils. The following information is from the *Soil Survey of Sacramento County, California* (USDA 1985).

The Sailboat-Scribner-Cosumnes soil series is found on natural levees, the edges of backswamps, channels and sloughs in the Delta area, and low flood plains adjacent to the Sacramento River. Sailboat soils are found on natural levees on low flood plains, are very deep and somewhat poorly drained; typically have a silt loam surface layer and underlying material comprised of stratified clay loam and loam. Scribner soils are on the edges of backswamps, are very deep and poorly drained, typically have a surface layer of clay loam and underlying material comprised of stratified clay loam and sandy clay loam. Cosumnes soils are found on low flood plains, are very deep and somewhat poorly drained soils; typically have a surface layer of silt loam and underlying material comprised of stratified silty clay loam and clay.

The Egbert-Valpac soil series is found on high flood plains, backswamps, and on the natural levees of high flood plains, primarily adjacent to the Sacramento River in the central part of the county and the northern part of the Delta area. Egbert soils are found on high flood plains and backswamps, are very deep, poorly drained, and typically have a surface layer of clay underlain by stratified clay loam and sandy clay loam. Valpac soils are found on natural levees of high flood plains, are very deep, somewhat poorly drained soils, and typically have a surface layer of loam underlain by stratified sandy loam to clay loam.

The Columbia-Cosumnes soil series is on narrow, low flood plains along the Cosumnes River and other streams. Columbia soils on narrow, low flood plains, are very deep, and typically have a surface layer of silt loam that are underlain by stratified sandy loam, silt loam, and loam. Some Columbia soils are underlain by clay. Cosumnes soils are on narrow low flood plains commonly downstream of the Columbia soils with a composition as above.

The Dierssen soil series is on the rims of basins on the west side of the county. Dierssen soils are moderately deep or deep, and typically have a sandy clay loam surface layer. The subsoil is calcareous clay underlain by a hardpan at a depth of 20-45 inches with a perched water table at a depth of 6-36 inches in the winter and early spring.

The San Joaquin soil series is found on low terraces in the western and central parts of Sacramento County. San Joaquin soils are moderately deep, moderately well drained soils and typically have surface layers of silt loam. The subsoil is a claypan underlain by a cemented hardpan at a depth of 20-40 inches.

Vegetation

The Cosumnes River Preserve protects a rich diversity of plant species: 442 species have been identified, of which 279 (63%) are California natives. Habitat types found at the Cosumnes River Preserve are described below. These descriptions follow the California Department of Fish and Game's Wildlife Habitat Relationship (CWHR) vegetation types.

Many of the areas bordering the river and sloughs on the Preserve are valley foothill riparian areas. Most trees are winter deciduous with the dominant species consisting of valley oak (*Quercus lobata*) and cottonwood (*Populus fremontii*). Subcanopy trees include Oregon ash (*Fraxinus latifolia*), box elder (*Acer negundo*), and white alder (*Alnus rhombifolia*). California wild grape (*Vitis californica*) frequently festoons both trees and shrubs, and provides 30 to 50% of the ground cover. Typical understory shrub layer plants include wild rose (*Rosa californica*), California blackberry (*Rubus ursinus*), blue elderberry (*Sambucus nigra ssp.cerulea*), poison oak (*Toxicodendron diversilobum*), button bush (*Cephalanthus occidentalis*), and willows (*Salix spp.*). Herbaceous vegetation constitutes about one percent of the cover. Herbs include sedges (*Carex spp.*), rushes (*Eleocharis spp.*), grasses, miner's lettuce (*Claytonia perfoliata*), Douglas sagewort (*Artemisia douglasiana*), poison hemlock, and stinging nettle (*Urtica dioica*).

The California Natural Diversity Data Base (CNDDB) identifies two special status plant communities along the Cosumnes River riparian zone; Great Valley Oak Riparian Forest and Great Valley Mixed Riparian Forest. There are four known special-status plant species in the Preserve that are associated with vernal pools, marshes, or slough habitats including dwarf dowingia (*Downingia pusilla*), rose-

mallow (*Hibiscus lasiocarpus*), legenere (*Legenere limosa*), and Sanford's arrowhead (*Sagittaria sanfordii*).

Valley oak woodlands are comprised primarily of valley oaks interspersed throughout an open grassland community. Other associated tree species include California sycamore (*Platanus racemosa*) and box elder. The shrub understory is often sparse and consists of such species as poison oak and California blackberry. Various annual grasses such as brome (*Bromus spp*.), wild oats (*Avena spp.*), barley (*Hordeum spp.*), and ryegrasses (*Lolium spp*.) as well as native grasses such as creeping wild rye (*Leymus triticoides*), blue wild rye (*Elymus glaucus*), meadow barley (*Hordeum brachyantherum*) and purple needlegrass (*Nassella pulchra*) dominate the ground cover.

Blue oak woodland habitats exist only at the far eastern edges of the Preserve and generally have an overstory of scattered trees within an open grassland community. Shrubs are often present but rarely extensive, often occurring on rock outcrops. The typical understory is composed of an extension of Annual Grassland vegetation. Common tree species include interior live oak (*Quercus wislizeni*) and valley oak. The ground cover is comprised mainly of annuals such as brome grass, wild oats, foxtail (*Hordeum spp.*), needlegrass, filaree (*Erodium spp*.), fiddleneck (*Amsinckia spp*.) and others.

Vast annual grassland habitat is found on the Preserve. These habitats are open grasslands composed primarily of annual plant species including wild oats, soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), wild barley, and annual ryegrass. The native California poppy (*Eschscholzia californica*) is also found in this habitat. Vernal pools, which support downingia, meadowfoam (*Limnanthes spp*.), and other native plant species, are found in small depressions within the annual grassland underlain by a hardpan or claypan layer.

There are approximately 1000 acres of managed wetland habitats on the preserve. Typically 80 to 150 acres are managed as perennial freshwater emergent wetlands that depend on year-round water availability. The emergent wetlands are typically characterized by species such as common cattail, bulrush, arrowhead (*Sagittaria spp*.), and the highly invasive, non-native water primrose. The remaining 850 to 920 acres are managed as seasonal wetlands that are typically characterized by annual and perennial species such as watergrass (*Echinochloa crus-galli*), swamp timothy (*Crypsis schenoides*), smartweed (*Polygonum spp.*), sprangletop (*Leptochloa spp.*), cocklebur (*Xanthium strumarium*), and sedges.

Wildlife

The Preserve hosts a rich and wide variety of wildlife species that inhabit wetland, upland, vernal pool, grassland, and riparian areas of the Preserve. There are 295 vertebrate species known to occur at the Preserve, including 247 species of birds, 30 species of mammals, and 18 species of amphibians and reptiles.

Many of the species that commonly occur at the Preserve are not specifically managed for as part of the Preserve's overall management strategy. However, these species benefit from habitat that is created, restored or preserved as part of the Preserve's projects and continued management. These species include black tailed deer (*Odocoileus hemionus)*, river otter (*Lutra canadensis*), California vole (*Microtus californicus*), beaver (*Castor canadensis*), American bittern (*Botaurus lentiginosus*), northern pintail (*Anas acuta*), redwing blackbird (*Agelaius phoeniceus*), western fence lizard (*Sceloporus occidentalis*), common kingsnake (*Lampropeltis getulus*), and desert cottontail (*Sylvilagus auduboni*).

The lower Cosumnes River watershed hosts a variety of special-status wildlife species including those wildlife species that have been designated as endangered, threatened, or species of special concern, or is proposed for listing (*i.e.,* candidate species) under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA). Special-status species known to occur on the Cosumnes River Preserve include vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California tiger salamander (*Ambystoma californiense*), western pond turtle (*Clemmys marmorata*), giant garter snake (*Thamnophis gigas*), greater sandhill crane (*Grus canadenis tabida)*, and Swainson's hawk (*Buteo swainsoni*).

Hydrology

The Cosumnes River watershed covers approximately 940 square miles (approximately 600,000 acres), from its headwaters in the Sierra Nevada to its confluence with the Mokelumne River in the Sacramento-San Joaquin Delta. The river remains as the only river flowing to the Central Valley in California without major dams.

The river segment from Highway 16 down to the tidal floodplains consists of a continuum of highly incised meandering channel lined with agricultural levees and limited riparian vegetation in the upper reaches. The river is less incised in the lower reaches where discontinuous low levees and riparian forests flank the channel. The tidal floodplain area includes the portion of the Cosumnes River from the confluence with the Mokelumne River, upstream to the limits of tidal influence near Twin Cities Road bridge. Much of the tidally influenced floodplain is farm fields protected by low levees that do not prevent seasonal flooding. In addition to the main stem of the Cosumnes River, several tributaries drain into the lower watershed: Deer Creek, Badger Creek, and Laguna Creek.

Winter storms account for about 80% of the annual precipitation in the Cosumnes River watershed. The Cosumnes River watershed typically does not receive significant amounts of snowfall because of its low peak elevation and, therefore, most floods are caused by intense rainfall events (Sacramento County Water Agency 2005).

Groundwater is typically found in distinct shallow and deep aquifer zones ranging in depth between 200 and 2,000 feet below the ground surface level. Measured groundwater levels in the basin have shown a regional decrease in groundwater elevations characterized by "cones of depression," formed north and south of the Cosumnes River, with groundwater levels as low as 80 feet below mean sea level. Historically, the input of groundwater to the river channel kept the channel and associated wetland areas wet throughout the summer for the entire length of the river. Over the past 60 years, however, groundwater pumping has reduced groundwater levels in the valley segment, leading to a decline of groundwater input to the river.

Fisheries

Thirty-eight fish species are found within or migrate through the Cosumnes River Preserve including a diverse variety of native and non-native species. Several species have been designated as special status species by the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service, and/or California Department of Fish and Game due to concern over their declining numbers. These species include fall-run chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), delta smelt (*Hypomesus transpacificus*), Sacramento splittail (*Pogonichthys macrolepidotus*), and Sacramento perch (*Archoplites interruptus*). Two special-status species, hardhead (*Mylopharodon*

conocephalus), and speckled dace (*Rhinichthys osculus*), have likely been extirpated from the Cosumnes River. The remaining 26 (65%) fish species have been introduced to California water bodies, either intentionally or unintentionally.

Recreation

In general, passive recreational activities, such as bird watching, photography, nature study, hiking and paddling, are encouraged on the Preserve. Designated areas have been set aside for limited hunting. Fishing is only allowed from a boat in waterways that are part of the public trust.

The Visitor Center is the focal point for public access and environmental education at the Preserve. The Wetlands Walk Trail is a one-mile, universally accessible trail that offers visitors an up-close experience into lush marshes, wetland plants, water birds, insects, and amphibians. The River Walk Trail is a 3-mile round-trip trail that winds through a variety of habitats, including buttonbush thickets, valley oak riparian forest, tule marsh, and valley oak savannah along the Cosumnes River. The Cosumnes River Preserve also offers non-motorized boat access via the Visitor Center ramp and floating dock as well as a self-guided driving tour throughout the public road system.

Visual Resources

The Cosumnes River Preserve is a major visual resource for the south Sacramento County area from a variety of perspectives. From a distance the distinct forested landscape appears as a natural wooded area in marked contrast to the surrounding agricultural and urban landscapes. Visitors experience a sense of visual enclosure from trails that traverse natural areas and especially from within the forests along the River Walk trail.

Cultural

There are nearly 180 documented archaeological sites within the Cosumnes River floodplain that are recorded in the California Historical Resources Information System. Of these, almost 160 are prehistoric/ethnographic sites of Native American origin; 18 date to the historic period (including both archaeological remains and standing structures); and 3 are dual-component prehistoric/historic-period sites. The reported location of many of these sites is poorly recorded and recent efforts to relocate many such sites have not been successful. There have been some inventories in recent decades,

prompted by various projects. Overall a very small portion of the Preserve has been inventoried to modern professional standards. The BLM archeologist analyzed the effects of the proposed action in this EA on significant cultural resources, as required under Section 106 of the National Historic Preservation Act. His analysis included a background records search, intensive field inventories in areas where ground disturbance is expected, and Native American consultations.

Currently two Native American tribes come to the Preserve to collect native plant materials for ceremonial headdress, basketry and traditional building materials for structures. These include the Ione Band of Miwok Indians and the Chapa-de.

Fire/fuels

There is a wide variety of fuel types and structure at the Preserve which include grass, shrub and tree species. The Preserve has routinely used prescribed fire for weed control and to reduce vegetation density. In addition, wildfires occur annually on Preserve lands caused by a variety of sources ranging from vehicle-caused fires to bird strikes at power lines. Fuels include down, standing dry, and live native and non-native grasses, forbs, shrubs and trees. A variety of exotic trees such as fig, tree of heaven, Osage orange, honey locust, black locust, and cherry plum which have been killed by previous eradication efforts also serve as standing dry or ladder fuels.

Social/agricultural

The current landscape of Central Valley, including the lower Cosumnes watershed, consists largely of agriculture, especially intensively managed irrigated crops. However, the Central Valley is one of California's more rapidly growing regions, gaining nearly two million more residents in the 1980's and 90's. In the last several years the Sacramento region has experienced explosive growth, with urban expansion driving further south and east. The City of Elk Grove is planning to expand beyond the existing Urban Service Boundary to as far south as Eschinger Road. The City of Galt is located to the east of the Preserve. The city has been working on a General Plan update with ideas of expanding northward, however, they have made few inroads with the agricultural community on this issue. Thornton is an unincorporated town located south of the Preserve in San Joaquin County. Like other small towns in the area, growth has stalled; however, there is continued land speculation in the area due to the relatively low cost of real estate.

The Preserve has an active education program and is currently a field trip destination for over 10,000 K-12 students annually. In addition 3000 K-12 students are involved in service learning projects, and more than 10 higher education field trips are attended by local and visiting colleges annually (J. Durand, pers. com. 2011). In addition the Cosumnes River Preserve is used by graduate and undergraduate college students for research projects. The Preserve also has an active Volunteer program with several subgroups and a total of over 120 volunteers.

Farming occurs on over 13,000 acres on the Cosumnes River Preserve, and approximately 2,000 acres of additional farmland have been protected through conservation easements. Of the total 13,000 acres in agricultural production, approximately 10,000 acres are managed to be compatible with wildlife. Grazing currently occurs on nearly 4,000 acres of annual grasslands in the Preserve. In addition, well over 15,000 acres of vernal pool grassland are grazed on lands held under a conservation easement.

Prime/Unique Farmland

Currently approximately 2,200 acres of prime farmland exists on the Preserve, primarily in the organic rice operation and on the Bean Ranch (aka McCormack-Williamson Tract), in the form of irrigated cropland. The *Soil Survey of Sacramento County, California* (USDA 1985) identifies Bruella sandy loam, Clear Lake Clay, Columbia sandy loam, Columbia silt loam, Cosumnes silt loam, Dierssen clay loam and Egbert clay as prime farmland where irrigated.

Area of Critical Environmental Concern

One management action of the RMP record of decision intends to designate the Cosumnes River Preserve as an Area of Critical Environmental Concern. The ROD states: "Relevant and important values include the existence or potential for restoration of: (1) valley oak (*Quercus lobata*) riparian forest; (2) seasonal wetlands; (3) vernal pools; (4) oak (*Quercus spp.*) savannah; and (5) agricultural lands such as irrigated pasture and crops that provide habitat for sandhill cranes (*Grus canadensis*) and a buffer for the Preserve." Special attention is required to protect relevant and important natural or cultural resource values.

Air Quality

Air quality on the Preserve is generally good; however because of its proximity to agricultural operations, which entail burning and plowing, as well as major urban areas (Lodi, Stockton and Elk Grove), higher concentrations of air pollutants may occur in summer and fall, as well as on stagnant, foggy winter days.

4.0 Environmental Effects

The following critical elements have been considered for this environmental assessment, and unless specifically mentioned later in this chapter, have been determined to be unaffected by the proposal: hazardous waste, wild and scenic rivers, wilderness, and environmental justices.

4.1 Impacts of the Proposed Action and Alternatives

Soils

As a result of the minimization and avoidance measures outlined in the proposed action, no long term negative impacts caused by chemical, mechanical, physical, cultural, or biological weed control actions are anticipated to the soils found on the Preserve. Over the long term, treatments that remove invasive vegetation, reduce fuels, and restore native plants would enhance soil quality on Preserve lands.

Impacts to soil compaction are not expected because areas requiring treatment by ground vehicle are primarily access roads and levees. Treatment of sites that are off road would be carried out using low impact vehicles including wheel or track equipment, and chemical treatments would be carried out using hand held or ATV-type equipment or by aerial application.

Chemical and mechanical treatments may directly or indirectly affect soil through plant removal resulting in changes in physical and biological soil parameters. As vegetation is removed, there is less plant material to intercept rainfall and less to contribute organic material to the soil. Loss of plant material and organic matter can increase the risk of soil susceptibility to erosion. However, the risk for

increased erosion would be temporary, lasting only until desirable vegetation was established. If herbicide treatments lead to re-vegetation with native plants, soil stability may be improved relative to sites dominated by invasive plants (PEIS 2007).

Due to the short half-life of the proposed herbicides, relatively rapid breakdown into inert components, and as a result of the minimization and avoidance measures outlined in the proposed action, no long term negative impacts caused by herbicide use are anticipated to the soils found on the Preserve. Over the long term, treatments that remove invasive vegetation, reduce fuels, and restore native plants should enhance soil quality on public lands (PEIS 2007).

Chlorsulfuron is a selective systemic herbicide with a relatively short average half-life of 40 days (EXTOXNET). Chlorsulfuron appears to be only mildly toxic to terrestrial organisms, and effects are generally transient (SERA 2004a) even though bacteria have an enzyme that is functionally equivalent to the herbicide target enzyme in plants.

Clopyralid is a selective herbicide with a short average half-life in soil of 40 days and is degraded rapidly in soil; however it does not bind to soil and has the potential to be highly mobile (Tu *et al.* 2001). Clopyralid is degraded primarily by microbes in soils and aquatic sediments (Pik et al. 1977). Rates of microbial metabolism increase with increasing soil moisture and temperature, and decrease with increasing amounts of organic matter (Tu *et al.* 2001). No metabolites accumulate during the degradation process, therefore, no additional contamination of the environment occurs (Pik et al. 1977).

Dicamba is a selective herbicide with a typical half-life of 14 to 28 days in soil (Caux *et al.*1993). Dicamba poorly absorbs to soil, and its high mobility contributes to a significant leaching potential (Howard 1989). Microbial degradation is the most probable route of degradation (Howard 1989).

Diquat is a non-selective, quick acting herbicide and plant growth regulator, causing injury only to the parts of the plant to which it is applied. It is not residual: that is, it does not leave any trace of herbicide on or in plants, soil, or water (EXTOXNET). Diquat is highly persistent, with reported field half-lives of greater than 1000 days (Wauchope *et. al.* 1992). It is very well adsorbed by soil organic matter and clay (Wauchope *et. al.* 1992). Although it is water soluable, its capacity for strong adsorbtion to soil particles suggest that it will not easily leach through the soil, be taken up by plants or soil microbes, or

broken down by sunlight. Field and laboratory tests show that diquat usually remains in the top inch of soil for long periods of time after it is applied (Tucker 1980). When diquat is applied to open water, it disappears rapidly because it binds to suspended particles in water (Gillett 1970). Diquat dibromide's half-life is less than 48 hours in the water column, and may be on the order of 160 days in sediments due to its low bioavailability (Tucker 1980, Gillett 1970). Microbial degradation and sunlight play roles in the breakdown of the compound (Gillett 1970).

Imazapyr is a non-selective pre and post-emergent systemic herbicide. Because imazapyr is a weak acid herbicide, environmental pH will determine its chemical structure, which in turn determines its environmental persistence and mobility (Tu *et al.* 2001). Below pH 5 the adsorption capacity of imazapyr increases and limits its movement in soil (Tu *et al.* 2001). Above pH 5, greater concentrations of imazapyr become negatively charged, fail to bind tightly with soils, and remain available (for plant uptake and/or microbial breakdown) (Tu *et al.* 2001). In soils imazapyr is degraded primarily by microbial metabolism (Tu *et al.* 2001). The half-life of imazapyr in soil ranges from one to five months (Tu *et al.* 2001). If it enters the water column, imazapyr can be photodegraded by sunlight with an average half-life of two days (Mallipudi *et al.* 1991).

Glyphosate products are non-selective, systemic herbicides that bind strongly to soil particles and have a short average half-life in the soil of 47 days (EXTOXNET). In water glyphosate is rapidly dissipated through absorption to suspended and bottom sediments and has a half-life of 12 days to ten weeks. (Tu *et al.* 2001). Glyphosate is biodegraded by soil organisms, and many species of soil microorganisms can use glyphosate as a carbon source (SERA 2003a). Single or repeated applications of glyphosate at the recommended field concentration had little effect on microbial communities (PEIS 2007).

Triclopyr products are selective systemic herbicides that have a short average half-life in soil of 46 days (Dow Chemical Company 1983). In soils, both salt and ester formulations of triclopyr degrade to the parent compound, triclopyr acid. Microbial metabolism accounts for a significant percentage of triclopyr degradation in soils (SERA 2003c). Offsite movement through surface or subsurface runoff is a possibility with triclopyr acid, as it is relatively persistent and has only moderate rates of adsorption to soil particles (Tu *et al.* 2001).

2,4-D is a selective broadleaf herbicide with a very short average half-life of 10 days in soil and less than 10 days in water (Tu *et al.* 2001). Studies have generally shown that at typical application rates, no effect from 2,4-D can be detected on soil macroorganisms (Eijsackers and Van Der Drift 1976). Furthermore, most studies of the effects of 2,4-D on microorganisms concluded that the quantity of 2,4-D reaching the soil from typical applications would probably not have a serious negative effect on most soil microorganisms (Bovey 2001).

Due to the potential for movement or persistence in some soils, clopyralid, chlorsulfuron, dicamba, and ester formulations of triclopyr will not be applied to areas where offsite movement is likely and non-target vegetation or water resources are at risk.

Vegetation

When properly administered and as a result of the minimization and avoidance measures outlined in the proposed action, no negative impacts are expected to occur to the 4 known special status plant species or the 10 other special status plant species that potentially occur on the Preserve.

No negative impacts to the two special status plant communities identified by the CNDDB, which include the Great Valley Oak Riparian Forest and Great Valley Mixed Riparian Forest, are expected because the native plants would not be targeted.

Implementation of the IWM Program at the Preserve would benefit plant communities with weed infestations by decreasing the growth, seed production, and competitiveness of target plants, thereby releasing native species from competitive pressure (*e.g.* water, nutrient, and space availability) and aiding in the reestablishment of native species (PEIS 2007).

Wildlife

Impacts to wildlife species may include a temporary reduction in the amount of escape cover from predators. Populations of Himalayan blackberry and yellow star thistle that provide dense spiny refuge for animals like desert cottontail, California quail (*Callipepa californica*), California voles, and other prey species would temporarily be reduced until native or desired vegetation could reestablish.

When the mechanical, cultural, physical, biological and chemical weed control techniques are properly administered and as a result of the minimization and avoidance measures outlined in the proposed action, no negative impacts to wildlife are expected because negative impacts to habitat components - soil, water and native vegetation - are expected to be temporary and future conditions will be improved.

Most wildlife will benefit from weed control on the Preserve by improving habitat conditions over the long term. Herbivores will benefit from the reduction of terrestrial weeds that are less palatable or unpalatable and compete with the native, desirable plant species. The reduction of water primrose is likely to improve habitat conditions for giant garter snakes which rely primarily on an aquatic prey base of small fish, tadpoles, frogs and minnows. When stream or lake habitats are completely covered by water primrose and water is no longer available due to absorption and evapotranspiration, that habitat becomes unsuitable for giant garter snakes. Foraging habitat for raptors, including Swainson's hawks, may also be improved from yellow star thistle and perennial pepperweed removal by providing better access to prey species on the ground. Invasive, non-native weed control would have beneficial effect on overall biodiversity by reducing competition for space, water and sunlight for native plant species that generally provide better habitat for wildlife.

Hydrology

As a result of the proposed action no negative impacts to hydrology are expected because only herbicides approved for aquatic use will be used on aquatic vegetation. Herbicides not approved for aquatic use will only be used near open water if potential for offsite movement is low and per a licensed Pest Control Advisor recommendation. A temporary increase in turbidity may occur as a result of mechanical treatments within areas where flooding occurs or within managed wetland ponds. However, increases in turbid water into the watershed are not expected because turbid waters will not be released into tributary water bodies. The proposed action would have a positive overall effect on the hydrology by removing or substantially reducing invasive aquatic weed species that alter flows and absorb and transpire water resources.

Fisheries

When properly administered and as a result of the minimization and avoidance measures outlined in the proposed action, no negative impacts to fisheries are likely to occur. Only chemicals considered being non-toxic to fish and aquatic organisms and that are approved for use will be used to control vegetation in aquatic environments. Application of all products that are considered to be toxic to fish or have the potential to be harmful to aquatic resources will be applied outside recommended buffer zones and/or in a manner that minimizes or eliminates potential for contamination of fish habitat. In addition, products that are toxic to fish or aquatic environments and are highly mobile will not be used when there is a high potential for offsite movement into fish habitat.

Positive impacts to native fish species are likely to occur because non-native vegetation would be replaced by native plant species that are ecologically adapted to survive in floodplains and other riverine areas, thereby providing high quality smolt rearing habitat.

Recreation

The reduction of noxious weed species along public access trails, at the boat ramp, and around the Visitor Center would improve the visitor experience and provide enhanced recreational opportunity by providing better access and viewing opportunities at the public areas. Additionally, visitor experiences also would be enhanced by the availability of native plant species along roads and trails. Short term impacts from the use of herbicides would include trail closures but this is not expected to be significant.

Visual Resources

Short term impacts to visual resources are likely to occur as chemically treated vegetation withers and dies and mechanically or physically treated areas are disturbed (*e.g.* disced, mowed or prescribed burned fields). The short term impacts will provide opportunities for public education about invasive weeds and long term benefits of improved visual resources. Visual resources on the Preserve would improve because of the reduction in exotic or noxious weed species. Native and desirable species are expected to fill in and persist where noxious exotic plants are removed, which would restore the visual landscape to a more natural setting.

Cultural Resources

The proposed action was subject to review, pursuant to Section 106 of the National Historic Preservation Act. The review was performed by the BLM archeologist and included a background records search, intensive field inventories of areas where ground disturbance is expected to occur, and Native American consultations. Consideration was also given to vegetation that is clearly associated with historic-era cultural resources. It is recommended that the proposed action would not affect significant cultural resources. Any potential conflicts would be avoided. Archeological sites within areas where ground disturbance would occur (as a result of discing, mowing, or hand pulling) would be flagged for avoidance. Resources gathered and used by Native American tribes would be avoided, or proposed treatments (with potential for conflict) would be rescheduled to accommodate Native American use.

Fire/Fuels

A short term increase of fuels would likely occur after chemical treatments of target vegetation such as Himalayan blackberry and yellow star thistle because of the residual dry fuels left after treatment. Other than the short term impacts to light fuels at treated sites, herbicide use would have little or no considerable effect on fires or fuels because the sources of ignition would continue to be present and the non-native weed fuels would be replaced by native vegetation or annual grasses. Although, a slight reduction in fire hazard could occur as a result of replacing short-lived, non-native plant species with native species that tend to stay greener longer into the summer dry season.

No adverse impacts to fire and fuels due to mechanical, cultural or physical control techniques such as mowing discing, grazing, hand pulling, and prescribed burning are expected because the proposed actions would reduce fuel loads and/or create areas that serve as fuel breaks that stop or slow the spread of fire.

A slight increase in the amount of larger fuels and standing dry fuels from dead exotic tree species killed by chemical treatment would occur. However, the replacement of dead exotic trees and shrubs with native trees and shrubs would ultimately lead to an overall reduction in the amount of ladder fuels that could carry fire into tree canopies.

Social/agricultural

The removal of noxious and invasive weeds may further improve relationships with the neighboring cities of Galt and Elk Grove by improving long term visual resources, recreational opportunities and the educational experience, as well as by reducing the risk of weed spread to adjacent privately owned land and fostering good relations between the Preserve and its neighbors.

Surrounding farmlands (including leased lands) would be positively affected by noxious weed removal because the risk of weed spread to adjacent lands would be reduced or eliminated. In addition, rangelands on the Preserve that are leased to local ranchers would have improved forage quality and palatability with fewer invasive species. Weed control would also have beneficial effects on other agricultural production on the Preserve, because as weed infestation decreased, quality and quantity of agricultural products produced would be likely to increase.

Prime/Unique Farmland

Due to the minimization and avoidance measures outlined in the proposed action, no adverse impacts to prime or unique farmland is expected. Because of the low toxicity of the products proposed for use and no use of herbicides within the organic rice operation, no negative impacts to soil microorganisms on prime farmland is expected from the use of chemical application. No adverse impacts are expected due to mechanical or physical control methods because methods such as mowing, discing, burning, and flooding are employed as standard agricultural practice and are unlikely to have adverse impacts on prime or unique farmland.

Area of Critical Environmental Concern

Due to the minimization and avoidance measures outlined in the proposed action, no adverse impacts to the ACEC values identified by the BLM are anticipated. An integrated weed management approach on the Preserve would benefit the ACEC values because the proposed actions would protect, restore or enhance the natural resources identified as having ACEC value.

Air Quality

Short term impacts to air quality associated with specific actions such as dust created by heavy equipment during mowing, discing, herbicide application, and grazing activities and smoke created prescribed burns to reduce vegetation or seed production are anticipated. However, impacts to air quality would be minimized by employing all best management practices for dust reduction and smoke management. Water trucks would be used to wet soils during ground disturbing activities when appropriate and prescribed burns would take place only when weather conditions were conducive to clearing and dissipating smoke rapidly. In addition all appropriate management actions described in the RMP ROD would be employed.

4.2 Impacts of the No Action Alternative

Soils

Under the no action alternative negative impacts to Preserve soils are likely. Noxious weeds and other invasive vegetation can impact soil function and reduce soil biodiversity. Sites infested with weeds often have more extreme soil temperatures that can alter soil moisture regimes (PEIS 2007). In addition, noxious and invasive weeds may alter nutrient availability for native species, alter soil constituents (*e.g.* soil fungi and bacteria), and slow the rate of natural plant succession (Olson 1999).

Under the no action alternative weed infestations would continue to spread and displace native plant species. If a integrated weed management strategy is not implemented it is likely that invasive plants would continue to spread rapidly, resulting in dramatic and potentially irreversible effects on soil quality through changes in organic matter content, diversity and abundance of soil organisms, and nutrient and water availability. Overall native biodiversity would be negatively impacted by the spread of invasive, non-native weed species because non-native plants generally out-compete native species for resources.

Vegetation

Under the no action alternative negative impacts to vegetation are likely. Noxious and invasive weeds that compete for resources with native or desired vegetation are likely to spread. Negative impacts to

native plant communities are expected because native plants in most situations are less able to compete with invasive non-native weed species for resources such as nutrients, sunlight, water, and space. As a result of increased coverage of noxious and invasive species the degradation of native plant communities would increase and negatively impact native biodiversity.

Wildlife

Under the no action alternative wildlife would be adversely impacted because invasive and noxious weed species would continue to spread and displace native or desirable plants that provide high quality habitat. Wildlife would be less likely to use degraded or marginal habitat. Foraging habitat for raptors, including Swainson's hawks, are likely to be negatively impacted by yellow star thistle and perennial pepperweed infestations because access to prey species on the ground would be reduced by tall, dense or thorny weed species. Other special status species such as sandhill cranes that prefer grassland or open habitat would also be negatively impacted by tall or dense weed infestations. Aquatic species such as the federally threatened giant garter snake are likely to be adversely impacted by the spread of invasive aquatic plants such as water primrose that quickly invade and completely cover open water habitat and reduce foraging opportunities.

Hydrology

Aquatic weeds will continue to spread depleting surface water resources as they absorb and transpire water through respiration. If water primrose, which is impractical to treat by mechanical methods alone, is left unchecked, it would quickly cover most of the surface of permanent water thereby degrading habitat quality or eliminating it completely. In addition invasive aquatic weeds which have thick root and shoot growth through the entire water column would continue to reduce or impede water flow throughout the Preserve.

Fisheries

Sites that have large monocultures of water primrose and other aquatic weeds may negatively impact fisheries as aquatic weeds spread or choke out water bodies that serve as open-water habitat. Non-

native invasive weed species would continue to spread in floodplain habitats displacing native plant species that are used by native fish.

Recreation and Visual Resources

The Preserve trail system and boat launch sites may be negatively impacted because the weeds that hang over and encroach onto trails make access more difficult. Tall weed species would create visual barriers to high quality wildlife viewing opportunities along the trails and driving tour. Monocultures of noxious weeds and/or mixed weed patches would persist and spread which would degrade the scenic value of the Preserve.

Cultural Resources

Under the no action alternative it is unlikely that the prehistoric sites on the Preserve would be severely impacted. Archeological sites that have standing structures would be at increased risk of damage or loss by fire because of the highly combustible light fuels formed by non-native, invasive species that build up near those sites. Adverse impacts are likely to occur to native vegetation collection sites as invasive weeds displace the native plants used by Native Americans.

Fire/fuels

Under the no action alternative, the frequency of fire on the Preserve will not be affected. Fuels however, are likely to have more of an adverse impact on the Preserve as the amount and height of fuels created by invasive weed species increases, which in turn would increase the intensity of the fires and capacity for fire to carry into the tree canopies.

Social/agricultural

If no action is taken to control non-native invasive weed species, relationships with adjacent land owners, neighboring cities, and education programs are likely to be negatively affected. The Preserve's image and reputation as a pioneer in ecologically sound restoration design would be damaged. Agricultural production and quality may decline as noxious invasive weeds became more dominant in crops and rangeland causing farmers to bare higher costs of additional weed control.

Prime/Unique Farmland

Prime or unique farmlands would be negatively impacted because invasive weeds would continue to spread or colonize on properties that are identified as having prime farmland. Because noxious weeds and other vegetation can impact soil function and reduce soil biodiversity (PEIS 2007), and some weeds also produce toxins or allelopathic compounds that can suppress the growth and germination of other plants (Kelsye and Bedunah 1989), prime and/or unique farmlands would be negatively impacted by continued spread of invasive or noxious weeds. Under the no action alternative highly invasive weeds such as perennial pepperweed, which have the ability to alter the soil to favor more halophytic plants (Young et al. 1995), are likely to spread into and degrade prime and unique farmlands.

Area of Critical Environmental Concern

If noxious and/or invasive weeds are allowed to spread throughout the Preserve negative impacts are expected to the ACEC values identified by the BLM. Encroachment and expansion of noxious and/or invasive species into fish and wildlife habitat identified as having ACEC value are likely to continue and are likely to severely degrade natural resources identified as having ACEC values.

Air Quality

Under the no action alternative it is unlikely that air quality would be impacted.

4.3 Cumulative Impacts

A) Proposed Action

Cumulative impacts from the proposed action combined with other weed control efforts within the Cosumnes River watershed are expected to be negligible and, over the long term beneficial. A short term maximum increase of approximately 1,782 pounds of active ingredient from chemical applications could be added to the environment on BLM-owned properties; however, due to the relatively short half lives of the proposed products (generally less than 40 days), breakdown into inert components, and low potential for offsite movement, no adverse cumulative impacts to soils or water

quality are expected regionally. By comparison, the Department of Pesticide Regulation (DPR) reports that in 2009 Sacramento County alone reported applying pesticides totaling 3,128,156 pounds of active ingredient (DPR 2011). Over time, non-native plants will be controlled or eradicated from Preserve properties and general habitat conditions for wildlife within the lower watershed would improve.

As a result of the proposed action some individual plants and animals may be adversely impacted temporarily, however no adverse cumulative impacts are expected to plant and animal populations. Stream flow regimes and water quality can be affected by modifications to watershed processes that occur as a result of the use of herbicides and/or mechanical means to control or remove invasive aquatic plant species such as water hyacinth and water primrose. Water quality and quantity, which are key components of wetland and riparian habitat, can also have substantial influence over the health of fish and other aquatic organisms (PEIS 2007). Because the condition of aquatic environments on the Preserve will be improved over the long term by removal of invasive aquatic weeds, adverse cumulative impacts to fisheries are not expected. Because there are no long-term site specific adverse impacts expected for agriculture, cultural resources, recreation, visual resources, or fire and fuels, no cumulative impacts are expected for these resources at a larger scale.

Non-federal Lands

Cumulative impacts from implementing the IWM Program on non-federally owned properties at the Preserve are not expected. In fact, those cumulative actions are expected to be complementary and beneficial to the Federal action. Effects are expected to be beneficial in nature because actions carried out on non-federally owned lands within the Preserve in conjunction with adjacent BLM properties would serve to enhance the BLM's own weed control efforts at the Preserve.

At present, of the 24,588 acres owned in fee title by Preserve Partners, approximately 22,799 acres are owned by non-federal agencies. In addition 21,271 acres are lands protected by conservation easements held by Preserve partners including the BLM. Approximately 36,500 of the 44,070 acres protected by non-federal agencies or by easement are currently in agricultural production (*e.g.,* crops and grazing) that require mechanical, physical, cultural, or chemical weed control at some level to remain productive. The remaining 7,570 acres of non-federally owned properties are natural, restored, or fallowed lands that also require or may require weed management. However, significant increases above current levels of impact are not expected and impacts over time are expected to decrease as infestations of weedy species are controlled and replaced by native vegetation.

Short term maximum increases above current levels of approximately 3,500 pounds of active ingredient from chemical applications could be added to the environment on partner-owned properties; however, due to the relatively short half lives of the proposed products (generally less than 40 days), breakdown into inert components, and low potential for offsite movement, no adverse cumulative impacts to soils or water quality are expected. Because noxious and invasive weed infestations would be controlled at lower levels or eradicated, use of control methods would decrease and long term adverse cumulative impacts to vegetation, wildlife, hydrology, fisheries, recreation, visual, and cultural resources, fire/fuels, social/agricultural, prime/unique farmland, and air quality would not be expected.

B) No Action Alternative

Cumulative impacts to the lower watershed are expected. Under the No Action Alternative, invasive non-native weed species would continue to spread. Herbicide use on lands outside the Preserve boundary are likely to increase as a result of increased invasive plant seed production and the spread of weeds to adjacent agricultural land. Increased use of herbicides outside Preserve boundaries may have adverse cumulative impacts to the Preserve and watershed as offsite use of chemical ingredients increase. Overall biodiversity in the lower watershed may be negatively impacted by the reduced quality and/or quantity of nesting, rearing and migration habitat. Severely degraded habitat that cannot be treated by mechanical, physical, or chemical methods is likely to have an adverse cumulative impact on special status species populations found within the Preserve. As invasive aquatic and terrestrial plants decrease and/or impede flows of tributary streams, cumulative impacts to fisheries and natural hydrologic regimes are likely. Cumulative impacts to recreation and visual resources may occur as a result of degraded scenic value and reduced access to navigable waterways. Cultural resources, including archeological and historic sites and materials, as well as traditional cultural properties, have a very limited ability to absorb cumulative impacts (PEIS 2007). Cumulative impacts to social and agricultural resources are expected as described above. Invasive plant infestations are likely to continue to spread and displace desirable species throughout the Preserve, thereby adversely impacting socioeconomic resources by decreasing productivity of agricultural resources.

5.0 Agencies and Persons Consulted

5.1 BLM Interdisciplinary Team

Mark Ackerman (Wildlife Biologist and Certified Pesticide Applicator, Cosumnes River Preserve, Mother Lode Field Office, BLM).
Harry McQuillen (Preserve Manager, Cosumnes River Preserve, Mother Lode Field Office, BLM)
Dianna Brink (Rangeland Management Specialist, California State Office, BLM)
Holden Brink (Wetlands Manager, Cosumnes River Preserve, Mother Lode Field Office, BLM)
James Barnes (NEPA Coordinator, Archeologist, Mother Lode Field Office, BLM)
Jeff Horn (Recreation Planner, Mother Lode Field Office, BLM)
Peggy Cranston (Wildlife Biologist, Mother Lode Field Office, BLM)

5.2 Other Personnel, Agencies and Organizations

Scott A. Johnson (Vegetation Management Specialist and Pest Control Advisor, Wilbur-Ellis)
Joel Trumbo (Staff Envronmental Scientist Pesticides Investigations Unit, California Department of Fish and Game)
Amber Veselka (Recreation Supervisor, Outreach & Volunteer Coordinator, County of Sacramento, Department of Regional Parks)
Alex Cabrera (Site Coorinator and Certified Pesticide Applicator, The Nature Conservancy)
Sara Sweet (Restoration Ecologist, The Nature Conservancy)
U.S. Fish and Wildlife Service, Sacramento Ecological Services Office

5.3 Availability of Document and Comment Procedures

The EA, posted on Mother Lode Field Office's website http://www.blm.gov/ca/motherlode under Information, NEPA (or available upon request), will be available for a 15-day public review period. Comments should be sent to the BLM at 5152 Hillsdale Circle, El Dorado Hills, CA 95762 or emailed to us at ca180@ca.blm.gov.

5.4 Interdisciplinary Team/Reviewers:

/s/ James Barnes	*9/7/11*
NEPA coordinator/Archaeologist	**Date**
Fuels specialist	**Date**
/s/ Sara Sweet	*8/31/11*
Botany	**Date**
/s/ Mark A. Ackerman	*9/6/11*
Wildlife/fisheries	**Date**

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6.1 Personal Communications

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